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# High field magnetic and transport studies of the antiferromagnetic Kondo system, $Ce_3Rh_3Sb_4$

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Ce-based Kondo lattices exhibit a broad range of ground states. We had earlier reported $Ce_3Rh_3Sb_4$ to be a kondo lattice ordering antiferromagnetically at 22K. We present high field magnetic and transport studies on this system. The magnetization at 5K is found to be linear up to about 3T and shows a sharp upturn above 4T, suggesting a metamagnetic behaviour. There is a clear high field slope at high fields up to 12T and hysteretic behaviour is seen as the field is decreased to zero. The magnetic moment at 12T is about 1.2 $\mu_B$ per Ce atom much above the value of 0.7 $\mu_B$ corresponding to the doublet ground state. The magnetoresistance(MR) at 5K is positive and shows a $H^2$ behaviour like in a typical antiferromagnet. However at high fields corresponding to the metamagnetic behaviour, the MR decreases, ultimately reversing the sign but the $H^2$ dependence is preserved. At temperatures much above the magnetic ordering, a negative MR is observed which is consistent with the kondo scattering and it has $H^2$ dependence. We compare the magnetic behaviour of this system with a related compound $Ce_3Cu_3Sb_4$.